Abstract

An adaptive equalizer finite impulse response (FIR) filter for high-speed communication channels with modest complexity, where the filter is iteratively updated during a training sequence by a circuit performing the update:

$\bar{h}(t+1) = \bar{h}(t) + \mu[\text{sgn}\{d(t)\} - \text{sgn}\{z(t) - Kd(t)\}]\text{sgn}\{\bar{x}(t)\}$, where $\bar{h}(t)$ is the filter vector representing the filter taps of the FIR filter, $\bar{x}(t)$ is the data vector representing present and past samples of the received data $x(t)$, $d(t)$ is the desired data used for training, $z(t)$ is the output of the FIR filter, μ determines the memory or window size of the adaptation, and K is a scale factor taking into account practical limitations of the communication channel, receiver, and equalizer. Furthermore, a procedure and circuit structure is provided for calibrating the scale factor K.